perseverance and endeavour in the face of difficulties, opposition and adverse criticism that would have daunted many. Great indeed as the advances in wireless telegraphy have been when regarded simply as advances in applied science, few things are more remarkable than the rapidity with which they have been made. It is less than ten years since the first experiments were made in the application of Hertz waves to signalling. Mr. Marconi himself began work a few years later—in 1896. In that year he was able to transmit signals over a distance of a mile or so, and ever since he has been steadily increasing the limit until, about one year ago, it was announced that the signal "S" had been transmitted from Cornwall to America. Many who were sceptical of this result at the time must have been convinced of its genuineness when a little later (last March) messages were transmitted to the *Philadelphia* up to a distance of 1551 miles from land and the signal "S" transmitted to a distance of 2099 miles. Following on this came the cruise of the *Carlo Alberto* during July, August and September last, when extremely successful results were obtained over great stretches of land and water. Finally, at the close of 1902, we have the inauguration of a complete Transatlantic system with transmission of messages in both directions. No one can consider this as other than a splendid record for six years' work.

Little need be said of the stations on either side of the Atlantic, since both have been already described and illustrated in NATURE (see vol. lxv. p. 416, and vol. lxvi. p. 485). It is to be hoped that before long we shall be able to record that both have been in continuous and successful commercial working without producing any ill effects on other installations. When this has been accomplished, the problem of syntony remains to be solved, and we wish Mr. Marconi the same complete success in dealing with this problem as has crowned his other efforts.

MAURICE SOLOMON.

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## *A SUB-TROPICAL SOLAR PHYSICS OBSERVATORY.*

WE have received from a correspondent in America the following letter by Prof. S. P. Langley, secretary of the Smithsonian Institution, suggesting the establishment of a great solar observatory in or near the tropics. Referring to the practical value of such studies of the sun as are suggested by Prof. Langley, our correspondent remarks:—"It is an amazing thing that the enormous utility of recent work on the sun's connection with the conditions which bring famine or plenty to India, for instance, is lost sight of by almost all astronomers. Astronomers and astrophysicists, even, are apt to look at it in its purely scientific interest, as if it had none other than what it might share with the discovery of the motion of a nebula."

The letter sent by Prof. Langley to the Hon. Charles D. Walcott, secretary of the Carnegie Institution, is given in the report of the executive committee to the trustees of the Carnegie Institution, published November 26, 1902, and reads as follows:—

*February* 28, 1902.

DEAR MR. WALCOTT,—You were saying to me that you knew of some persons who might be desirous of aiding, through the Smithsonian Institution, some large object, and I was led to write you what is in substance the following letter:

I learn from yours of February 14 that you would like to call it to the attention of the executive committee of the Carnegie Institution, and, as I have written, I shall be very glad to have you do so, asking you to make it clear that it is in no way a request from the Smithsonian Institution, but a suggestion from me of a great object which Mr. Carnegie himself may care to take up.

I do so the more readily because, considering the Institution wholly apart from its own needs, it would be the glad means of indicating to those who wish some worthy aim for expenditure, some specific object, which may be undertaken if desired *in their own name* and through any worthy medium they prefer.

One of these is the determination of the heat the sun sends the earth and the causes of its probable variation. The progress of solar physics has been such in the last few years as to make it of interest to every inhabitant of the planet that this progress should be carried further, not only in scientific, but in economic, and in even humanitarian interests.

The establishment of a great observatory in the tropical or sub-tropical regions at a high altitude would advance our knowledge of the heavenly bodies in a degree more than could be done by all the physical observatories in the world united. To the founder of such an observatory there would be enduring fame, but it is an affair of a very great deal of money, possibly to be reckoned only in millions. The establishment and maintenance for eleven years of a distinctly solar observatory under these conditions would enable us to study the sun as it has never yet been studied, and through an entire solar cycle, for much less cost.

While this latter research, then, is to be pursued at less cost than the foundation of a great general observatory, it has a specific object of literally world-wide importance and interest.

The determination of the heat the sun sends the earth annually is the determination of that through which everything on the planet lives and moves, and almost unknown slight variations of this heat are the probable, if remote, cause of the changing character of the seasons and of the lack or plenty in the crops upon the earth as a whole.

It has seemed possible within the last few years that if we had this knowledge, the years of plenty and of famine could be forecasted as we now forecast a coming storm through the advices of the Weather Bureau. It is possible, I say, but I do not wish to say more than that it is possible.

I do not know any greater or more worthy object for the expenditure of 500,000 dollars than the settlement of this latter great question would be. It is, with our present knowledge, almost a question of money; but no Government is prepared to spend such a sum except for its own interest. This is for the interest of all the people in the whole world, and I entirely concur with the recommendation of its importance from the chief of the United States Weather Bureau, which I enclose. I should gladly see it undertaken, whoever does it.

Very truly yours,

S. P. LANGLEY.

The Honorable CHARLES D. WALCOTT.

In a further letter, sent on October 20 to Prof. G. E. Hale, who asked for details of the proposed scheme of work and equipment, Prof. Langley described the principal objects of inquiry of a distinctly solar observatory, the plan of observations, and apparatus and accessories required.

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## *NOTES.*

THE management of the Imperial Institute will from January 1 be vested in the Board of Trade, assisted by an advisory committee representing various Government Departments and the Indian and Colonial Governments. The Board of Trade has appointed Prof. Wyndham Dunstan, F.R.S. (now director of the scientific and technical department of the Institute), to be Director of the Imperial Institute. Prof. Dunstan will continue in charge of the scientific investigation of economic products, and will supervise any other branches of work carried on by the Board of Trade in the building at South Kensington, including the collections of products of the Empire so far as they will be under the control of the Board. These arrangements do not affect the parts of the collections and the information offices under the special charge of representatives of the India Office and of certain Colonial Governments.

IN consequence of the presentation of a memorial in favour o the admission of women to the fellowship of the Linnean Society, the council issued a circular in March last inviting an expression of opinion on the part of the whole body of fellows. The result has been that 301 fellows have pronounced in favour of the proposal and 126 against it, whilst 313 fellows gave no reply. This expression of opinion is considered sufficient to justify further action; accordingly the matter will be brought before a special general meeting on January 15. As the existing charter gives no power to the society to admit women as fellows, a resolution will be moved to obtain a supplemental charter for this purpose.

In consequence of frequent cases of sickness and death caused by poisonous substances in salted raw fish used for food, the committee of the Caspian fishery and seal industries several years ago offered a prize for the investigation of the nature of the fish-poison, for indications of the methods of preventing fish from becoming poisonous, and for the healing of persons poisoned by fish. The accumulated interest and capital now amount to 7500 roubles (about 1050*l.*). The Imperial Academy of Sciences, St. Petersburg, acting with the Ministry of Agriculture and Crown Domains, have now issued particulars of a new competition on the nature of fish poison and the antidotes. The persons competing for the award offered in the interest of public health will be expected to offer solutions of the following problems:—(1) By careful experiments to define the qualities of poison contained in fish; (2) to investigate the action of the poison of the independent organs of animal bodies, the central nervous system, the heart, the circulation of blood and the digestive organs; (3) to present an accurate illustration of the pathological reactions in the various parts of animal and human bodies caused by such poisoning; (4) to present a description of the signs serving to distinguish fish containing poison from normal fish; (5) to indicate methods for the prevention of development of poison in fish; (6) to indicate antidotes and general provision against poisoning by fish. The awards for the competition will be three premiums, viz. 5000 roubles (700*l.*), and two of 1500 roubles (210*l.*) and 1000 roubles (140*l.*). The two lesser prizes may be gained should the author solve only a part of the problem, basing his experiments upon one method of science—chemistry, physiology or bacteriology. As regards the larger prize, this will be awarded only for the work which covers the problem of the nature of the fish-poison in all respects. The work sent in to compete for the awards may be written or printed in Russian, Latin, French, English or German, and should be submitted by October 1, 1903, to the Ministry of Agriculture and Crown Domains.

Mr. N. F. Dobrée, of Beverley, has presented his collection of European Noctuæ to the Hull Municipal Museum. This collection contains more than five thousand specimens and is one of the finest in the country.

The death is announced of Prof. Richard Baron Von Krafft-Ebing, professor of psychiatry at Vienna and author of works on psychiatry and physiological psychology.

We regret to announce that Mr. Otto Hilger, the well-known astronomical and optical instrument maker, died on December 18, at fifty-two years of age.

Mr. A. Carnegie has expressed to the Provost of Greenock his willingness to present to a properly authorised authority in the town the sum of 10,000*l.* to defray the cost of the erection of a memorial to James Watt; or he is willing to head a movement in America to raise a large fund which, added to what might be subscribed in Great Britain, would enable a wider scheme for a memorial to be arranged.

One of the subjects discussed at the recent conference of Colonial Premiers was that of an Imperial Patents Act whereby one patent would cover the whole Empire. Mr. G. C. Douglas, writing to the *Times* of December 30, points out that such a measure would help enormously in the building up of industrial concerns. In the United States of America, one patent covers a territory with an industrial population of about seventy millions, whereas it takes about forty patents to protect an invention in the British Empire. If it were decreed that one patent covered Great Britain, India and the various other dependencies, our great self-governing Colonies would probably soon unite with the Government to make the reform an Imperial one.

A Reuter telegram from Syracuse states that shortly after eight o'clock in evening of December 28 a severe shock of earthquake was felt, preceded by subterranean rumbling.

A Reuter telegram from St. Thomas on December 27 reports that a violent eruption of Mont Pelée was in progress at 10.30 that morning. Dense grey smoke and dust were pouring out to a great height. Advices from other sources state that the cone of the volcano was luminous at night.

Prof. Lacroix, the conductor of the French scientific expedition sent to Martinique, has, *La Nature* says, reported to the Colonial Minister an account of the consequences of the shattering of the cone formed in the crater of Mont Pelée. Blocks of incandescent lava rolled in the direction of the White River and filled it. Volcanic material six kilometres from the crater, which had collected in the neighbouring valley, had eight days after the eruption a temperature exceeding 100° C. On December 15, symptoms premonitory of an eruption were experienced at Kingston, St. Vincent, and on December 18 a new eruption occurred, but caused no accident.

A Reuter's telegram from the scene of the recent earthquake at Andijan, dated December 23, states that the shocks continue and are daily increasing in violence.—December 26, *Ashkabad.* Oscillations of the earth are still noticeable. In Andijan and neighbourhood, 15,000 houses have been destroyed. Andijan as a town has existed for 400 years, and has already been visited by earthquakes.—December 28, *Ashkabad.* A long and violent earthquake shock was felt at Andijan at 10 p.m. yesterday.—December 29, *St. Petersburg.* The earthquake at Andijan on December 16 extended over an area of nearly seven hundred square miles. The epicentrum of the disturbance has been located about four miles to the south of Andijan. It is indicated by a rent made in the earth from which sand, water and mud are thrown up. The statical wave was about 28 inches high, and took a northerly direction.

We learn from *Science* that Prof. H. V. Hilprecht has been awarded the Lucy Wharton Drexel medal of the University of Pennsylvania for his archæological researches.

At the concluding meeting of the Egyptian Medical Congress on December 24, it was held that the international rules applying to plague and cholera required revision, and the wish was expressed that an international congress should meet forthwith to lay down rules in accord with the demands of science.

We learn from *Science* that the Carnegie Institution of Washington has made a grant of 500 dollars to Prof. Bancroft, of Cornell University, for a systematic study of the bronzes; an annual grant of 10,000 dollars to revive the "Index Medicus," formerly published under the direction of Dr. J. S. Billings; and a grant of 1000 dollars to the astronomical department of Vassar College to enable Dr. Caroline E. Furness to make measurements and reductions of photographs of the stars in the region of the north celestial pole.

At the dinner on December 22 to Major Ronald Ross, in honour of his being awarded the Nobel prize, the Lord Mayor of Liverpool dispatched a telegram to the King. The following message was received in reply:—"I have submitted your telegram to the King and I am commanded, in reply, to request you to congratulate Major Ross on the honour which has been conferred upon him by the King of Sweden.—Knollys."

AN expedition sent by the New York Botanical Garden to Nova Scotia and Newfoundland has secured, the *Scientific American* states, 12,000 specimens of more than 2000 species of plants. A third of the specimens are marine plants. Another expedition sent to north Montana by the same enterprising institution has done much in the interest of scientific botany. Many alpine forms of plants were discovered. Ample statistics were secured establishing the variation of plant life caused by temperature and latitude, and of the general vertical distribution of flora.

REFERRING to Mr. Backhouse's letter on sunset glows in last week's NATURE (p. 174), the Rev. G. J. Bridges, writing from Salisbury, says :—"In addition to the colour growing less vivid, the colouring' does not occupy so much space as in the Krakatoa glows. It occurs much sooner after sunset and much nearer sunrise than in the case of those which occurred in 1883. . . . The dust wisps are so much more defined of late that it is difficult to distinguish them from faint streaks of strata except by position, which appears to be always horizontal and corresponding to the curvature of the earth."

IN most of our colonies, more particularly those which are concerned with agriculture, the official botanical staff is no longer considered to be complete without a specialist in plant diseases. The reports and pamphlets embodying the researches of these specialists bear evidence of valuable and important work. An account of the fungus diseases which attack stone-fruit trees in Australia has been prepared by Mr. D. McAlpine. The principal diseases are described at some length and illustrated with very excellent coloured plates. These present diagnoses suited to the farmer whose scientific knowledge is limited, and methods of treatment are suggested and explained. Besides, there is added an account of many less common fungi also destructive to trees bearing stone-fruit, which presupposes a certain amount of botanical training.

THE report of the Director of the Botanic Gardens, Sydney, N.S.W., for 1901, besides dealing with matters appertaining to the Botanic Gardens, includes the improvements effected in the various public gardens which come under his control. An event of considerable importance was the opening of new buildings which had been erected in order to accommodate the National Herbarium and provide space for a botanical museum. The latter occupies one of three large rooms, while the other two are set apart for the cryptogamic and phanerogamic herbaria respectively. An interesting feature of the museum is a collection of local plants; also due prominence has been given to characteristic Australian plants, such as the Acaciæ, Eucalypti, various genera of the Proteaceæ, and Coniferæ. Reference is made to the trees planted by their Royal Highnesses the Duke and Duchess of Cornwall and York on the occasion of their visit to Sydney.

MR. F. C. CONSTABLE directs attention to the serious disadvantages of the common practice of hanging on the walls of schoolrooms maps of various countries of widely differing areas, all drawn to different scales, with the result that the countries appear, approximately, of the same size. One of the direct consequences of this custom is that comparatively few educated persons can give the relative sizes of, say, England and Africa, of Canada, Australia and British India, with any approach to accuracy. This defect in geographical teaching is by some teachers avoided by the use of wall-maps of the continents having printed in the corner a map of England to the same scale to serve as a key. It should not be difficult for teachers to prevent their pupils from obtaining an erroneous sense of proportion.

A DISEASE resembling "farcy," the cutaneous form of glanders, has been found to be prevalent in the Philippines. It is, however, not glanders, but is due to a blastomycetic parasite which can be detected in the lesions, and may be isolated and cultivated from these, though with some difficulty.

THE Punjab Government has been compelled temporarily to suspend its scheme for extensive inoculation against plague. A portion of the vaccine fluid became contaminated and induced tetanus in a small number of persons who were inoculated with it. During the month of October, no fewer than 120,000 people were voluntarily inoculated, and it had been intended to supply 70,000 doses of the vaccine fluid per diem had not this unfortunate mishap occurred.

SIR WILLIAM MACGREGOR, in an address delivered to th students of medicine of Glasgow University, dealt especially with the prophylaxis of malaria. As the outcome of his great experience, he recommended the preventive use of quinine in doses amounting to at least 15 grains a week. He stated that in Lagos the radical method of Ross for the extermination of mosquitos is being pursued by filling in the swamps with sandy soil. The large pools which cannot be drained at present have crude petroleum put on the surface periodically. Empty tins and similar rubbish are removed, and receptacles for drinking water are kept carefully covered. Native boys are now being employed as mosquito catchers, and should be upon the fixed establishment of every European resident in such a place as Lagos.

SIR CHARLES TODD has supplied the following notes on the rainfall during the past winter (April to September) in South Australia :—As compared with the average at thirty-seven selected stations distributed over the colony, the six months' fall is, without exception, far below the average amount. It is, in fact, one of the driest years ever experienced—so far as all the northern areas are concerned it is the driest—and the same applies to many parts of the south. At twenty-four out of the thirty-seven stations, the winter of 1902 is the driest on record, whilst at eight others only one other year was drier. At Adelaide, where the records go back to 1839, during the six months April to September, 1902, we have registered only 9·49 in., or 4·64 in. under the general average; in 1891, however, we only had 7·62 in. in the same time; in 1869, 8·73 in., and in 1876, 9·24 in., whilst in 1886 we recorded 9·43, about the same as in 1902, so that as regards the city that year is not a record.

MANY theories have been put forward to account for the so-called "black and white dot phenomenon" visible on diatom valves under high powers of the microscope. A discussion of several of these theories is given by Mr. Julius Rheinberg in the *Journal* of the Quekett Microscopical Club for November. After discarding the hypothesis of spherical aberration of the object on the ground that it does not fully account for the variations observed, Mr. Rheinberg gives reasons for his opinion that the effects are due to crossing of cones of light and darkness arising from total reflection beyond the critical angle between the mounting medium and the diatom. If this hypothesis is accepted, the dots on the diatom must be regarded as perforations the depths of which are greater than their breadth; this appears to be Mr. Rheinberg's view. Lastly, a diagram of the critical angles of different media relative to diatom silex and of the amounts of light totally reflected agrees fairly well with observation.

MESSRS. ELSTER AND GEITEL, in a recent number of the *Physikalische Zeitschrift*, describe an improvement in Exner's electroscope rendering the reading of the deflections more accurate. To one of the glass sides of the instrument a mirror is attached which reflects a scale fixed on the outside of the case. The positions of mirror and scale are such that the image of the scale when seen through an observing lens is in the same plane as the edges of the electroscope leaves. Parallax is thus avoided, and the deflection of the leaves can be read with great accuracy. In the same issue, these authors describe a convenient form of portable dry pile, giving a pressure of 2000 volts, for use in experiments on the radio-activity of the atmosphere. The pile is made up of gold and silver plates built up in columns of 200 pairs fitted on ebonite rods, thirty sets being connected in series inside a metal case. The pile gives no current, but can maintain the potential of a conductor at −2000 volts; it is said to keep in good order for several years if proper precautions are taken.

THE South African corals of the genus Flabellum receive attention at the hands of Mr. J. S. Gardiner in a recent issue of "Marine Investigations in South Africa" (vol. ii.). The author pays special attention to the anatomy and development of these organisms, and emphasises the importance of studying the polyp as well as the corallum if we hope to gain any real idea of their true relationships.

AN additional note by Dr. Forsyth Major on *Ocapia liebrechtsi* appears in *La Belgique Coloniale* for November 30. The author figures both the male and the female skulls, the latter of which is hornless. It is suggested, however, that in some instances female okapis may carry small horns. In conclusion, it is pointed out that as the okapis of the present day are natives of a continent where zebras and antelopes abound, so their extinct forerunners, the Palæotragi of the Pliocene, were associated in southern Europe and Asia with troops of hipparions and antelopes allied to modern Ethiopian types.

WE have received from the Smithsonian Institution three papers from the *Proceedings* of the U.S. Museum. The first, by Mr. C. B. Wilson, deals with North American parasitic copepod crustaceans of the family Argulidæ. It is the first of a series dealing with the large collection of this very remarkable group contained in the Museum, and, in addition to the description of these, will contain a bibliography of the entire assemblage. It is mentioned that the typical European *Argulus foliaceus* is the only member of the group which has hitherto been fully described. In the second paper, Miss M. Rathbun treats of Japanese stalk-eyed crustaceans, describing as new one hermit-crab and nine shrimps. In the third, Messrs. Jordan and Fowler continue their review of the fishes of Japan, treating in this instance of the berychoid group.

WE have received from the publisher (Herr G. Fischer, of Jena) a copy of the second, and popular, edition of Dr. C. Chun's "Aus den Tiefen des Weltmeeres," the original edition of which was reviewed in NATURE of March 6, 1902 (vol. lxv. p. 409). The mere fact that a second edition has been found advisable affords sufficient evidence that the work is deemed a success by the public. The present issue is, however, by no means a simple replica of its predecessor. No less than eighty-two additional illustrations have been introduced into the text, while some of the original illustrations have been replaced by better ones. Moreover, the text itself has been expanded by the introduction of additional chapters dealing with the deep-sea fauna, especial attention being devoted to the description of the eyes and light-organs of abyssal animals. The new illustrations include many of tropical landscapes and others of ethnographical subjects, while views of icebergs and of the desolate scenery of Kerguelen Island are also notable additions. The present enlarged edition forms an exceedingly handsome and attractive volume, which cannot fail to interest all lovers of travel and natural history.

THE U.S. Department of Agriculture has recently issued three pamphlets dealing with the protection of the fauna of the country and the traffic in game, skins, &c. The first of the three is an enlarged and revised edition of Dr. T. S. Palmer's summary of the legislation for the protection of birds other than those classed as game. The second is a digest of the game laws for 1902, by Messrs. Palmer and Olds, giving full information with regard to close-seasons, shipment, sale and licenses. In the third and shortest, the Secretary of the Department summarises the regulations connected with the trade in birds and game between the different States of the Union. It is satisfactory to learn that the regulations for the protection of birds of which the plumage is used for ladies' dress, &c., are now extremely stringent. "Under these statutes, birds which are in demand for millinery purposes are protected throughout the year, and sale and possession, as well as killing, are prohibited. It should be remembered that the principal centres for millinery supplies are nearly all located in States which have such laws, and the purchase of native song-birds, as well as of herons, pelicans, gulls, terns, grebes or other plume-birds, should be avoided."

IN the early days of the Hudson Bay Company, a large number of skins of birds and mammals were sent from the Kewatin territory to naturalists in Europe for description, and upon the evidence of these specimens numerous species were named. Of late years, but little attention has been paid to the natural history of this semi-Arctic tract, while most other parts of North America have been ransacked for zoological specimens. And as some of the Hudson Bay species were founded on indifferent specimens, while of others the types have either been lost or are now in too bad condition for comparison, great difficulty has been experienced in correlating the fauna of the area with that of the adjacent territories, especially Alaska. To remedy this unsatisfactory state of affairs, an expedition to collect specimens was dispatched some time ago by the U. S. Biological Survey, under the charge of Mr. E. A. Preble. The results of this expedition are now published as No. 22 of the *North American Fauna*. In this fasciculus, Mr. Preble gives a full series of notes on the mammals and birds of the area, illustrated by reproductions of a number of photographs of the scenery. Of mammals, two species and four races are described as new. Perhaps the most interesting of these is the barren-ground vole (*Microtus aphorodemus*), which is described as nearly allied to *M. drummondi*, but of larger size, with a stouter skull.

THE general report on the operations of the Survey of India during 1900–1901, prepared under the direction of the Surveyor-General in India, Col. St. G. C. Gore, has now been published. Parties were employed during the year in the determination of astronomical latitudes in the Karachi longitudinal series and also on experimental work connected with the Jäderin base line apparatus. Preparations for the commencement of the magnetic survey continued during the year, and it has been arranged to establish base stations at Bombay, Kodaikanal, Dehra Dun, Calcutta and Rangoon, at which places magnetic observatories are to be built and self-recording instruments installed. The recent introduction of electric tramways in Calcutta, and their impending construction in Bombay, have rendered it necessary to arrange for the construction of new observatories at some distance from the two cities. Four parties of observers were engaged on topographical operations in Burma, one on the Lushai Hills of Assam and one in the Kangra and Simla districts. Cadastral survey operations were conducted in Bengal, the United Provinces and in Burma. Forest surveys were carried out in Madras, Bombay, Burma, Bengal, the Central Provinces and the Punjab. The report is much more concise than in previous years, owing, doubtless, to the instructions for curtailment issued in 1899.

THE "*Knowledge* Diary and Scientific Handbook for 1903," issued from *Knowledge* office, is a compendium of scientific dates, facts and data which will be found useful to students in many departments of scientific work. In addition to a general astronomical ephemeris and a calendar of events of scientific interest for each month, the book contains six charts showing the movements of twelve of the principal planets during 1903, and twelve small charts which show the appearance of the heavens during each month. There are also many useful tables and several short articles, on practical work with the spectroscope, the observation of variable stars, systematic botany and other subjects.

## OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN JANUARY:—

Jan. 2. 4h. 37m. Transit (egress) of Jupiter's Satellite IV. (Callisto).
2–3. Epoch of Quadrantid meteoric shower (radiant 230° + 52°).
6. 4h. 33m. Transit (ingress) of Jupiter's Satellite III. (Ganymede).
10. 8h. 41m. Minimum of Algol ($\beta$ Persei).
12. 19h. 20m. to 19h. 37m. Moon occults $\lambda$ Geminorum (mag. 3·6).
13. 5h. 30m. Minimum of Algol ($\beta$ Persei).
14. 8h. 14m. to 9h. 8m. Moon occults $\alpha$ Cancri (mag. 4·3).
15. Illuminated portion of the disc of Venus = 0·982, of Mars = 0·910.
17. 12h. Mercury at greatest elongation, 18° 45′ East.
20. 21h. Saturn in conjunction with the sun.
30. 10h. Venus in conjunction with Jupiter. Venus, 0° 44′ South.
30. 10h. 22m. Minimum of Algol ($\beta$ Persei).

MAGNETIC STORMS AND SUN SPOTS.—In an article communicated to No. 4, vol. xvi. of the *Astrophysical Journal*, Father Cortie, S.J., discusses the probable connection between terrestrial magnetic disturbances and solar activity.

Instead of dealing with mean values over an extensive period, he has compared the times of occurrence of specific isolated phenomena which have occurred during the three years 1899–1901, inclusive, and from this comparison has arrived at the conclusion that the relation is certainly not simply one of cause and effect, but rather the relation of two effects springing from a common cause.

For example, in support of this conclusion, the writer analyses the occurrences of the first six months of the past year as follows. The only spot of any size to cross the sun's disc during this period was the one observed between March 5 and 13, yet this was unaccompanied by any striking magnetic disturbance. From March 13 to May 19, the visible disc was completely free from spots, and the faculæ observed were faint and unimportant, yet a comparatively vigorous magnetic disturbance took place on April 10.

Father Cortie concludes from his detailed analysis of the last sun-spot minimum that "It may be possible that sun spots are one of the instrumental causes of magnetic storms, though not the only one, but it is more likely that the two phenomena are correlated as two connected, though sometimes independent, effects of a common cause."

OBSERVATIONS OF THE PERSEIDS, AUGUST 10 AND 11, 1902.—In No. 100 of *Popular Astronomy*, Mr. Charles P. Olivier gives the results of the observations of this shower which were made at the Leander McCormick Observatory of the University of Virginia.

On August 10, during a watch which lasted from 9h. 26m. to 16h. 8m., 44 Perseids and 28 other meteors were seen, whilst on August 11 (13h. 38m. to 16h. 8m.) 76 Perseids and 26 other meteors were recorded. The maximum display occurred during the period 13h. 59m. to 14h. 59m. on August 11, 30 Perseids and 11 other meteors being recorded during that hour.

The colour of the brighter Perseids was generally orange, and the radiant points for the two dates were $\alpha = 39^\circ{\cdot}5$, $\delta = +56^\circ{\cdot}7$, and $\alpha = 46^\circ{\cdot}8$, $\delta = +56^\circ{\cdot}7$ respectively. The latter radiant was very accurately determined from an apparently stationary meteor which appeared directly over the sixth-magnitude star D.M. + 56°·798 The paths of about one-half of the meteors observed were plotted on two charts, reproductions of which accompany Mr. Olivier's article.

THE MOSCOW OBSERVATORY.—Vol. iv. of the second series of the "Annales de l'Observatoire Astronomique de Moscou," published under the editorship of Prof. W. Ceraski, gives all the details and results of the observations made at that observatory since the last similar publication was issued.

During this interval, important work has been done in refurnishing the observatory and providing it with new instruments, in order that it may pursue its researches on modern lines. A new Henry-Repsold refractor, having two fifteen-inch objectives, has been added to the equipment of the observatory, and one of smaller dimensions is now in course of construction. The meridian circle, which has been in use since 1855, is at present being reconstructed to suit modern requirements.

The results published include the following:—Meridian circle observations, by M. B Modestow; calculations of occultations by the moon, observations of the Leonid showers of 1897–8–9, and observations of Mars (illustrated by drawings) during 1896 and 1897, by M. S. Blakjo; observations of occultations, by MM. Sternberg, Modestow and Blakjo; and a photometric study (illustrated by two charts) of Coma Berenices, together with a description of the useful work performed with a binocular, of 15 mm. aperture, by M. Ceraski.

## ELECTROCHEMICAL NOTES.

THE literature of electrochemistry and electrometallurgy is rapidly increasing in volume and importance, and busy people find an increasing difficulty in keeping themselves well informed as regards the more recent developments in these new branches of science and industry. The value of periodic subject-indexes of current literature on this subject is therefore very great, and all interested in these new sciences will hail with pleasure the appearance of a monthly sheet entitled *Elektrochemische Technik*, which contains an alphabetical subject-index of all recent articles dealing with applied electrochemistry, electrometallurgy and electrotyping.

This sheet is edited and published by Dr. F. Peters, of Berlin, and the first issue is dated October, 1902. It contains references to 107 recent articles on the subjects covered by the index, and French, German, English and American papers and journals have been searched in compiling this index. In some cases, short abstracts have been given of the articles indexed.

Our issue of May 22 contained a note upon the electric resistance furnaces patented and manufactured by Heraeus, of Hanau, Germany, and the use of such furnaces for melting-point determinations. These furnaces have latterly been reduced in cost and improved in efficiency by the substitution of platinum foil only 0·007 mm. in thickness for the wire originally used, and a recent issue of the *Zeits. f. Elektrochemie* contains some notes by Dr. Haagn—the chemist to the Hanau firm, upon the use of the tube form of the improved furnace for laboratory determinations.

The most important of these for the chemist is the application of the Heraeus furnace to organic elementary analysis, and, according to Dr. Haagn, this application has been attended with success. We suppose that, when used for this purpose, the platinum spiral encircling the glass combustion tube is cut up into several sections, each with its own current connections, so that successive portions of the tube can be heated as desired. The great advantage of such a furnace, from the chemist's point of view, will be the reduction of the heat losses by radiation and by the escaping gases, since these in the usual form of gas-combustion furnace are very great, and in summer time render organic analysis a most trying and tedious operation. Other proposed applications of the Heraeus tube furnaces are for the direct estimation of carbon in steels, and for the determination of ash in coal and coke. The maximum temperature attainable with these furnaces is 1700° C., and this limit is due to the inability to produce tubes, which will retain their form at this or higher temperatures.

The use of the electric current for heating glass furnaces does not seem a very promising application of electric power to those acquainted with the high degree of efficiency obtained in the modern regenerative gas furnace now generally employed in the glass-making industry. According to a recent issue of the *Zeit-*